***Force, Motion and Simple Machines Study Guide – Advanced 6th grade***

Newton’s 3 Laws:

**1st Law: (law of inertia)**

* An object in motion will stay in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

unless acted upon by an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* An object at rest will remain at rest unless acted upon by a force
* How does mass affect inertia?

**2nd Law: (describes force and momentum)**

* Acceleration produced depends on the \_\_\_\_\_\_\_\_ being pushed
* Momentum is a measure of the strength of an object’s motion
* The greater the mass and velocity, the greater the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3rd Law: (action and reaction)**

* For every action there is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction

**Force** – a push or \_\_\_\_\_\_\_\_\_\_\_

Friction is an example of force that is difficult to avoid. Name the 3 types of friction:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Describe how balanced and unbalanced forces affect motion:

**Velocity** – refers to speed and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Speed** – how fast something moves in a certain time

Speed formula:

* If you travel 7.5km and walk for 1.5h, what is your average speed?

**Acceleration** – a change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or direction of a moving or stationary object

What is the acceleration due to gravity?

Acceleration formula:

* Find the acceleration of a train that goes from 45 m/hr to 90 m/h in 5 seconds

Motion is a change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why is holding a stack of wood not considered work, but carrying a feather across the room is?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the rate at which work is done and is measured in watts.

List the six simple machines we have learned about and give an example of each.

What is the difference between a compound and a simple machine?

What is mechanical advantage and how is it calculated?

What is effort force?

Calculate:

1. What is the force of an object that had a mas of 23 kg and an acceleration of 8 m/s2 ?
2. An ostrich runs 15 km in 30 min. What is the ostrich’s average speed?
3. Find the acceleration of a plane that goes from 0 to 220 m/s in 20 seconds.
4. A hydraulic lift exerts a force of 12,000 N to lift a car 2 m. How much work is done to the car?